


Gender Norms, Gender Role Conflict/Stress and HIV Risk Behaviors Among Men in Mpumalanga, South Africa

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Abstract Men's gender role conflict and stress (GRC/S), the psychological strain they experience around fulfilling expectations of themselves as men, has been largely unexplored in HIV prevention research. We examined associations between both men's gender norms and GRC/S and three HIV risk behaviors using data from a population-based survey of 579 18–35 year-old men in rural northeast South Africa. Prevalence of sexual partner concurrency and intimate partner violence (IPV) perpetration in the last 12 months were 38.0 and 13.4%, respectively; 19.9% abused alcohol. More inequitable gender norms and higher GRC/S were each significantly associated with an increased odds of concurrency ($p = 0.01$; $p < 0.01$, respectively), IPV perpetration ($p = 0.03$; $p < 0.01$), and alcohol abuse ($p = 0.02$; $p < 0.001$), controlling for demographic characteristics. Ancillary analyses demonstrated significant positive associations between: concurrency and the GRC/S sub-dimension *subordination to women*; IPV perpetration and *restrictive emotionality*; and alcohol abuse and *success, power, competition*. Programs

to transform gender norms should be coupled with effective strategies to prevent and reduce men's GRC/S.

Keywords Gender role · HIV · Sexual behavior · Violence · Alcohol · South Africa

Introduction

Gender-related norms, beliefs, and experiences are recognized as key drivers of HIV vulnerability worldwide and in South Africa, where HIV incidence and prevalence are among the highest in the world [1–4]. Drawing from feminist theoretical perspectives, scholars have posited that inequitable gender norms legitimize men's power over women and promote HIV risk behaviors as acceptable and expected masculine behavior [5, 6]. A growing body of empirical research, including studies conducted in South Africa, supports this notion. In particular, men who hold more inequitable norms are more likely to engage in

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multiple and concurrent sexual partnerships [7, 8]; perpetrate intimate partner violence (IPV), which can limit women's ability to refuse sex or insist on safer sex [9–12]; and abuse alcohol, which disinhibits sexual and violence behaviors and increases attendance at venues where sexual partners meet [13–16].

While these studies suggest an important link between inequitable gender norms and HIV risk, considerable knowledge gaps remain. First, most extant global research examining the link between gender-related constructs and HIV risk has focused exclusively on the role of gender norms, or adhering to or endorsing culturally defined standards for male and/or female behavior. Little attention has been paid to the potential contributory role of gender-related conflicts and stresses about these roles that may predict men's behavior more directly than measures of gender norms or ideologies [17]. The concepts of gender role conflict and stress have their origin in Pleck's (1981, 1995) Gender Role Strain Paradigm, and refer to the psychological strain men experience around fulfilling expectations of themselves as men [18–21]. For example, men may experience strain around being successful and maintaining power over others, feeling subordinated to women at home or in the workplace, restricting their emotions, and performing and achieving in the sexual realm. Such strain causes many men to engage in behaviors that are harmful to themselves and others, as a way of compensating for perceived failures and/or as a form of maladaptive coping with stress [21, 22]. A wealth of research conducted in the U.S. and other Western countries that has drawn from this paradigm has found evidence that higher levels of gender role conflict and stress are significantly and positively related to men's IPV perpetration and alcohol abuse, as well as adverse psychological outcomes such as depression, anxiety and anger [20, 21, 23–28]. This research is based on two related psychosocial scales, the Gender Role Conflict Scale, developed by O'Neil (1986) [29], and the Masculine Gender Role Stress Scale, developed by Eilser and Skidmore (1987) [20].

Despite compelling theoretical and empirical evidence suggesting that gender role conflict and stress may drive HIV risk behavior, no quantitative research has examined this linkage in South Africa or any African setting, where the burden of HIV is extreme. Recent qualitative and ethnographic studies among men in South Africa consistently identify a "crisis of masculine identity" particularly related to men's chronic inability to provide financially for their families, the cornerstone masculine role in South Africa, as in most societies [30–32]. In response, many men are turning to alternate means of gaining self-esteem and social status as men, such as through sexual prowess, and seeking to assert power and control over women,

increasing HIV vulnerability of men and their partners [31–33].

A second knowledge gap relates to the fact that relationships between gender norms and/or gender role conflict/stress and behavior may differ depending on the specific dimensions being assessed and/or the particular behavior under examination [21, 34, 35]. For example, a number of studies in the U.S. have shown that men's strain related to restricting their emotions may predispose them to use violence against their partners [24]. More research is needed to systematically examine whether and how associations between gender-related constructs and HIV risk behaviors may differ as a function of the particular construct and/or behavior being examined.

A more comprehensive and nuanced understanding of whether and how gender norms and gender role conflict/stress (GRC/S) are related to HIV risk behaviors among South African men may inform both theory and the development of specific prevention strategies. To this end, the current study examined associations between gender norms and GRC/S and three key HIV risk behaviors (sexual partner concurrency, IPV perpetration, and alcohol abuse) among men ages 18–35 in a high HIV prevalence rural area in Mpumalanga Province, South Africa. We hypothesized that holding more inequitable gender norms and having higher GRC/S would be significantly associated with increased odds of reporting each of the three risk behaviors. Further, we explored the associations with risk behaviors across different sub-dimensions of GRC/S.

Methods

Data Source and Study Setting

Data come from the baseline survey of the study *Community Mobilization for the Prevention of HIV in Young South African Women*, a 2-year cluster randomized controlled trial of an intervention to change inequitable gender norms, particularly among men [36]. The baseline survey was conducted from March to June 2012 among men ($n = 581$) and women ($n = 600$) ages 18–35 in 22 villages in the rural Agincourt area of the Bushbuckridge sub-district in Mpumalanga province, where 22% of adults are living with HIV [4, 37]. Like many rural areas of South Africa, Agincourt is densely populated and characterized by few employment opportunities and high levels of circular or temporary migration for labor, particularly among men, but increasingly among women. The area is dry, with limited subsistence farming and roads that are largely unpaved. The 22 villages in the study are part of the

Agincourt Health and Socio-demographic Surveillance System (Agincourt HDSS), where an annual census has been taking place since 1992 [38].

Sample and Procedures

Individuals were identified through a sampling frame of 18–35 adults enumerated during the 2011 census [38]. For sample selection each household was designated as either male or female based on census data (in order to generate adequate sampling frames for each gender in each community), and individuals of that gender in the household were randomly ranked (1, 2, 3, etc.). On entering a home the individual randomly ranked first was screened for the following more detailed eligibility criteria: person lived in the home, 18–35 years old per confirmed date of birth, and had lived in the study area for the past 12 months. If the first individual did not meet these eligibility criteria, the second was screened, and so on. Only one individual was interviewed per household.

After eligibility was confirmed and informed consent obtained, the surveys took place in the participant's household and generally lasted 1–2 h. Surveys were conducted in the local language of Shangaan or in English, depending on the respondent's preference. Surveys were administered using computer assisted personal interviewing (CAPI), in which the interviewer reads each question to the respondent, then enters the answer into an electronic form on a laptop computer. The survey was translated from English into Shangaan, back-translated, and revised as necessary. The study was approved by the Institutional Review Boards at the University of North Carolina-Chapel Hill and University of California-San Francisco, the Human Research Ethics Committee at the University of the Witwatersrand in South Africa, and the Mpumalanga Department of Health and Social Development Research Committee.

Only men were included in the present analysis. Among 620 eligible men, 581 men were enrolled into the study (94%); 35 refused to participate (6%), and 2 (<1%) did not enroll for other reasons (an additional 2 men (<1%) were misclassified as women at the time of data collection and were not included in the present analyses). Two individuals were missing all 28 GRC/S scale items and were dropped from analyses, for a final sample size of 579. Other missing data for the Gender Equitable Men's scale (GEMS) and GRC/S scale items was minimal; six individuals were missing values on one GEMS item each, and two individuals were missing values on one GRC/S scale item each. These missing values were replaced by the mean of the individual's complete responses to other items [39].

Measures

HIV Risk Behaviors

Concurrency in the last 12 months was assessed among all participants. Individuals who had not yet had sex (13%) were coded as not practicing concurrency. Individuals reporting having ever had sex completed a partner grid in which they were asked the month and year of first and last sex with their last 3 partners. As recommended by UNAIDS [40], we categorized men who reported overlapping date ranges in the 12 months before the interview as having had concurrent partnerships; this approach directly assesses temporal overlap in partnerships and may produce less social desirability bias than reporting only on current partnerships.

IPV perpetration in the last 12 months was also assessed for the whole sample. For individuals who had never had an intimate partner (17%), we counted this as not perpetrating IPV. Individuals who reported ever having had a partner responded to a World Health Organization (WHO) questionnaire adapted for South Africa [41]. Participants were asked if they had carried out any of seven kinds of physical or sexual IPV (e.g., pushing, grabbing or slapping your partner; using force, like hitting, holding your partner down, or using a weapon, to make your partner have sex) in the past 12 months. Men were defined as perpetrating IPV in the past 12 months if they reported at least one of the seven types of IPV in that time period.

Recent alcohol abuse, defined as a pattern of drinking that results in harm to one's health, interpersonal relationships, or ability to work [42], was measured among all participants using the Alcohol Use Disorders Identification Test (AUDIT) [43]. This measure, which was developed by the WHO based on an extensive six-nation validation trial [44], includes 10 items about recent alcohol use, alcohol dependence symptoms, and alcohol-related problems, with a possible range of 0–40. Scores were dichotomized, with a score of 8 or more considered alcohol abuse, following WHO AUDIT recommendations as well as other recent studies on alcohol abuse in South Africa [43, 45, 46].

Gender Role Measures

Gender norms and gender role conflict/stress (Table 1) were measured with multi-item scales that we adapted/developed and evaluated through psychometric analyses with this sample as described previously [47].

Gender norms (Table 1) were measured using an adapted version of the GEMS. GEMS, originally developed by Pulerwitz and Barker (2008) in Brazil [48], has now been used in many studies of HIV risk and violence behaviors in sub-Saharan Africa [49–51]. We adapted the

Table 1 Inequitable gender norms and GRC/S measures

Scale/factor	Items <i>Do not agree at all, somewhat agree, agree a lot</i>	Properties		
		No. of items*	Raw scores** (mean, range)	Cronbach α / Raykov's ρ
Gender equitable men's scale (GEMS)	<ul style="list-style-type: none"> • A woman should tolerate violence to keep her family together • If someone insults a man he should defend his reputation with force if he has to • A man using violence against his wife is a private matter that shouldn't be discussed outside the couple • It is the man who decides what type of sex to have • Men are always ready to have sex • Men need sex more than women do • You don't talk about sex, you just do it • A woman who has sex before she marries does not deserve respect • Women who carry condoms on them are easy • It is a woman's responsibility to avoid getting pregnant • Only when a woman has a child is she a real woman • A real man produces a male child • Changing diapers, giving a bath, and feeding kids are the mother's responsibility • A woman's role is taking care of her home and family • The husband should decide to buy the major household items • A man should have the final word about decisions in his home • A woman should obey her husband in all things 	17	32.5 17–51	0.79/0.71
Gender role conflict/stress (GRC/S) scale-composite	(Composite includes all items below)	24	50.1 24–72	0.83/0.83
<i>GRC/S scale sub-dimensions</i>				
<i>Success, power, competition</i>	<ul style="list-style-type: none"> • I worry about failing and how it affects my doing well as a man • I am often concerned about how others evaluate my ability to provide for my family • I strive to be more successful than others • I sometimes define my personal value by my ability to make money or find work • Feeling that I am in good physical condition is important to me as man • Being physically stronger than other men is important to me • I always strive to win in sports competitions • Having a girlfriend or wife is part of my idea of being a successful man 	8	20.7 8–24	0.80/0.73
<i>Subordination to women</i>	<ul style="list-style-type: none"> • Making more money than a woman is a measure of my value and personal worth • Being outperformed at work by a woman would make me uncomfortable • I would be concerned if my friends knew I live with a woman and did any housework • I do not like to let a woman take control of the situation • I would be concerned if my friends knew I stayed at home to take care of children while my wife goes to work • Having a female boss would be difficult for me 	6	11.6 6–18	0.65/0.69

Table 1 continued

Scale/factor	Items <i>Do not agree at all, somewhat agree, agree a lot</i>	Properties		
		No. of items*	Raw scores** (mean, range)	Cronbach α / Raykov's ρ
<i>Restrictive emotionality</i>	<ul style="list-style-type: none"> • I have difficulty telling others I care about them • Talking about my feelings during or after sex is difficult for me • I often have trouble finding words to describe how I am feeling • I do not like to show my emotions to other people • Having someone see me cry would be difficult for me 	5	8.8 5–15	0.65/0.72
<i>Sexual prowess</i>	<ul style="list-style-type: none"> • Being able to perform sexually is important to me as a man • I feel that I always need to be ready for sex with my partner, even if I am tired • I worry about being unable to become sexually aroused when I want • It is important to me to know I can drink as much or more than others • Having sex is part of being a successful man 	5	9.0 5–15	0.68/0.73

* All items for each scale/factor were summed, with 1, 2, 3 points for ascending responses

** Raw scores incorporate sampling weights and account for clustering

scale for the present study from an Ethiopian version, which had achieved high internal consistency reliability [51], with items modified slightly for relevance to the South African context [47]. The scale used in the current study included a series of 17 third-person belief statements related to violence, sexual relationships, reproductive health and disease prevention, and domestic chores and daily life. Response categories were “Do not agree at all,” “Somewhat agree,” and “Agree a lot.” In previous psychometric analyses, we confirmed a unidimensional model fit and internal consistency reliability measures ranging from 0.71 (Raykov's ρ (rho)) and 0.79 (Cronbach's alpha) [47]. We generated aggregate scores for each individual by taking the sum of the scale items.

Gender role conflict/stress (GRC/S) (Table 1). To create a measure of GRC/S relevant to the South African setting and to the HIV-related outcomes of interest in this study, we developed a scale for the South African context [47] by combining sub-dimensions and item wording from two scales commonly used in Western settings that have demonstrated good validity and reliability as well as ability to predict outcomes of interest (e.g. anxiety, depression, IPV and alcohol abuse): the Gender Role Conflict Scale [21, 29] and Masculine Gender Role Stress Scale [20]. We called the resulting scale the “Gender Role Conflict/Stress” (GRC/S) scale. The scale included a series of items in first person, designed to tap into the individual's gender role anxiety and distress—for example, “I worry about failing and how it affects my doing well as a man” and “Making

more money than a woman is a measure of *my value and personal worth*”. Reliability of the multidimensional scale was good, with an alpha and rho of 0.83; reliabilities of the sub-dimensions were also adequate, ranging from 0.65 to 0.80 (see Table 1) [47]. Psychometric analyses confirmed that the scale was multidimensional with four sub-dimensions including: *Success, power, competition; Subordination to women; Restrictive emotionality; and Sexual prowess* [47]. The sub-dimension *Success, power, competition* can be defined as concern about success as pursued through power and competition [24]. *Subordination to women* is discomfort with being outperformed or controlled by a woman [20]. *Restrictive emotionality* is having restrictions and fears about expressing one's feelings, as well as restrictions in finding words to express basic emotions [24]. Finally, *sexual prowess* is concern about performance and achievement in the sexual realm [20]. We generated aggregate scores for each individual on the GRC/S scale-composite and the GRC/S scale sub-dimensions by taking the sum of the scale items. Higher total scores represent a higher level of strain related to masculine roles.

Covariates

We assessed several socio-demographic characteristics including age, highest education level completed, employment status (earned any income in the past 3 months), and marital status (never married, divorced/separated/widowed, or married (legal or traditional).

Statistical Analysis

We conducted weighted logistic regression to examine associations between GEMS, the GRC/S scale, and each outcome variable (concurrency, IPV perpetration, and alcohol abuse). Scaled weights, determined based on the proportion of total eligible households per village and total eligible males per household, were used to account for differential sampling probabilities and to represent the distribution of men aged 18–35 years in Agincourt based on the 2011 Agincourt HDSS. Robust standard errors were used to account for clustering by village [52]. For ease of interpretation, scores for GEMS, the GRC/S-composite, and GRC/S sub-dimensions were standardized prior to analyses. Bivariate logistic regression was used to examine unadjusted associations between each scale and each outcome behavior. We then estimated a series of four multivariate (i.e., adjusted) logistic regression models for each outcome behavior, in order to look at both the independent and combined effects of the constructs. Models 1, 2, and 3 examined the adjusted associations between GEMS (model 1), the GRC/S-composite (model 2), and the GRC/S sub-dimensions (model 3), controlling for demographic covariates. Model 4 included both GEMS and the GRC/S-composite as well as demographic covariates. Analyses were performed using SAS version 9.3 (SAS Institute Inc., Cary, NC, USA).

Results

The mean and range of scores for GEMS, the GRC/S composite, and GRC/S sub-dimensions are presented in Table 1. For GEMS, the mean was slightly below the middle of the range, representing slightly more equitable than inequitable norms. For the GRC/S scale, the mean score was slightly above the middle of the range, representing slightly higher than lower conflict/stress. The highest mean scores were for the sub-dimensions *Success*, *power*, *competition* and *Subordination to women*. GEMS and the GRC/S scale are moderately correlated ($r = 0.48$, $p < 0.01$). Typical tests of collinearity such as the variance inflation factor, and assessing model fit for a factor including all GEMS and GRC/S scale items together [53], did not suggest collinearity (data not shown).

Socio-demographic characteristics of the sample and prevalence of HIV risk behaviors are presented in Table 2. Men ranged in age from 18 to 35 (mean 22.4). Most (60%) had completed some high school. Thirty percent of men had earned any income in the past 3 months. Most participants (85%) had never been married (legal or traditional).

Prevalence of concurrency in the last 12 months was 38.0, 13.4% of men reported perpetrating IPV in the last 12 months, and 19.9% abused alcohol. Most of the men who reported perpetrating IPV in the last 12 months had perpetrated one out of the seven measured types of IPV,

Table 2 Weighted sample characteristics (n = 579 men)

Variable	Weighted mean (range) or %		
Demographics			
Age	22.4 (18–35)		
Education (highest level completed)			
Primary or less	11.5%		
Some high school	60.1%		
Completed high school	28.4%		
Employment status			
Earned any income in past 3 months	31.3%		
Marital status			
Never married	85.2%		
Divorced/separated/widowed	5.3%		
Married (legal or traditional)	9.5%		
HIV risk behaviors		Age 18–24	Age 25–35
Concurrency in the last 12 months	38.0%	39.0%	35.0%
IPV perpetration in the last 12 months	13.4%	16.4%	4.2%**
Recent alcohol abuse	19.9%	17.1%	28.6%**

** $p < 0.01$ for difference between age categories

and a majority of the types of reported IPV were a less severe type of physical IPV (“I pushed, grabbed or slapped my partner” or “I twisted my partner’s arm or hair, or threw something at them that could hurt them”). Less than 5% had perpetrated a more severe type of IPV, and less than 1% had perpetrated either of the types of sexual IPV (“I used force to make my partner have oral or anal sex” or “I used force, like hitting, holding my partner down, or using a weapon, to make them have sex”).

We also assessed prevalence of each HIV risk behavior by age group 18–24 and 25–35. There was no significant difference in prevalence of concurrency across younger versus older age group, at 39 and 35%, respectively. IPV perpetration was higher among younger men than older men (16.4 vs. 4.2%, $p < 0.01$). In contrast, alcohol abuse was higher among older men than younger men (17.1 vs. 28.6%, $p < 0.01$).

Concurrency

Results of models examining concurrency as an outcome behavior are presented in Table 3. In bivariate analyses, we found that GEMS, the GRC/S-composite variable, and the GRC/S sub-dimension *Subordination to women* were positively and significantly associated with concurrency. In the multivariate models that were adjusted for demographic covariates (models 1–3), a 1 SD increase in GEMS was significantly associated with a 1.31 increased odds of concurrency (95% CI: 1.07–1.62, $p = 0.01$), and a 1 SD increase in the GRC/S-composite was significantly associated with a 1.26 increased odds of concurrency (95% CI: 1.06–1.50, $p < 0.01$). In addition, concurrency was significantly associated with the GRC/S sub-dimension *Subordination to women* (AOR 1.36, 95% CI: 1.01–1.83,

$p = 0.04$). None of the other GRC/S sub-dimensions were associated with concurrency. Effects were attenuated in the combined model (model 4), such that neither GEMS nor the GRC/S-composite were significantly associated with concurrency.

IPV Perpetration

Results of models examining IPV perpetration as an outcome behavior are presented in Table 4. In bivariate analyses, GEMS, the GRC/S-composite, and the GRC/S sub-dimensions *Subordination to women* and *Restrictive emotionality* were positively and significantly associated with IPV perpetration. In multivariate models (models 1–3), a 1 SD increase in GEMS was significantly associated with a 1.31 increased odds of IPV perpetration (95% CI: 1.03–1.65, $p = 0.03$), and a 1 SD increase in the GRC/S-composite was significantly associated with a 1.48 increased odds of this behavior (95% CI: 1.17–1.88, $p < 0.01$). IPV perpetration was also significantly associated with the GRC/S sub-dimension *Restrictive emotionality* (AOR: 1.50, 95% CI: 1.12–2.00, $p < 0.01$), but not any of the other sub-dimensions. In the combined model (model 4), only the GRC/S-composite remained significantly associated with IPV perpetration (AOR: 1.42, 95% CI: 1.11–1.83, $p = 0.006$).

Alcohol Abuse

Results of models examining alcohol abuse as an outcome behavior are presented in Table 5. In bivariate analyses, the GRC/S-composite and the GRC/S sub-dimensions *Success, power, competition*; *Subordination to women*; and *Sexual prowess* were positively and significantly associated with

Table 3 Concurrency: Logistic regression results among men ($n = 579$)

	Unadjusted: crude odds ratio (95% CI)	Model 1: GEMS AOR (95% CI)	Model 2: GRC/S AOR (95% CI)	Model 3: GRC/S sub dimensions AOR (95% CI)	Model 4: combined AOR (95% CI)
GEMS	1.27 (1.05–1.52)*	1.31 (1.07–1.62)*	–	–	1.23 (0.98–1.54)
GRC/S-composite	1.23 (1.02–1.49)*	–	1.26 (1.06–1.50)**	–	1.15 (0.96–1.37)
GRC/S sub-dimensions					
<i>Success, power, competition</i>	1.23 (0.95–1.58)	–	–	1.16 (0.84–.60)	–
<i>Subordination to women</i>	1.32 (1.07–1.62)*	–	–	1.36 (1.01–1.83)*	–
<i>Restrictive emotionality</i>	0.96 (0.78–1.18)	–	–	0.81 (0.63–1.02)	–
<i>Sexual prowess</i>	1.16 (0.09–1.38)	–	–	1.05 (0.82–1.34)	–

AOR adjusted odds ratio, CI confidence interval. Significant results have been bolded for emphasis. Standardized scores were used for all gender constructs. All analyses controlled for age, education, employment status and marital status. All analyses also incorporated sampling weights and accounted for clustering

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 4 IPV perpetration: Logistic regression results among men (n = 579)

	Unadjusted: crude odds ratio (95% CI)	Model 1: GEMS AOR (95% CI)	Model 2: GRC/S AOR (95% CI)	Model 3: GRC/S sub-dimensions AOR (95% CI)	Model 4: combined AOR (95% CI)
GEMS	1.34 (1.06–1.70)*	1.31 (1.03–1.65)*	–	–	1.10 (0.87–1.39)
GRC/S-composite	3.37 (1.74–6.52)***	–	1.48 (1.17–1.88)**	–	1.42 (1.11–1.83)**
GRC/S sub-dimensions					
<i>Success, power, competition</i>	1.28 (0.97–1.68)	–	–	1.08 (0.72–1.63)	–
<i>Subordination to women</i>	1.52 (1.12–2.06)**	–	–	1.27 (0.86–1.88)	–
<i>Restrictive emotionality</i>	1.69 (1.25–2.28)***	–	–	1.50 (1.12–2.00)**	–
<i>Sexual prowess</i>	1.02 (0.77–1.34)	–	–	0.84 (0.56–1.27)	–

AOR adjusted odds ratio, CI confidence interval. Significant results have been bolded for emphasis. Standardized scores were used for all gender constructs. All analyses controlled for age, education, employment status and marital status. All analyses also incorporated sampling weights and accounted for clustering

* p < 0.05 ** p < 0.01 ***p < 0.001

Table 5 Alcohol abuse: Logistic regression results among men (n = 579)

	Unadjusted: crude odds ratio (95% CI)	Model 1: GEMS AOR (95% CI)	Model 2: GRC/S AOR (95% CI)	Model 3: GRC/S sub dimensions AOR (95% CI)	Model 4: Combined AOR (95% CI)
GEMS	1.30 (0.97–1.75)	1.40 (1.04–1.87)*	–	–	1.15 (0.85–1.55)
GRC/S-composite	1.55 (1.17–2.06)**	–	1.58 (1.22–2.03)***	–	1.49 (1.11–1.98)**
GRC/S sub-dimensions					
<i>Success, power, competition</i>	1.69 (1.14–2.51)**	–	–	1.56 (1.12–2.16)**	–
<i>Subordination to women</i>	1.34 (1.01–1.78)*	–	–	1.31 (0.85–1.71)	–
<i>Restrictive emotionality</i>	1.03 (0.80–1.34)	–	–	0.87 (0.65–1.17)	–
<i>Sexual prowess</i>	1.50 (1.14–1.98)**	–	–	1.20 (0.88–1.63)	–

AOR adjusted odds ratio, CI confidence interval. Significant results have been bolded for emphasis. Standardized scores were used for all gender constructs. All analyses controlled for age, education, employment status and marital status. All analyses also incorporated sampling weights and accounted for clustering

* p < 0.05 ** p < 0.01 ***p < 0.001

alcohol abuse. In models that were adjusted for demographic covariates (models 1–3), a 1 SD increase in GEMS was significantly associated with a 1.40 increased odds of alcohol abuse (95% CI: 1.04–1.87, p = 0.02), and a 1 SD increase in the GRC/S-composite was significantly associated with a 1.58 increased odds of this behavior (95% CI: 1.22–2.03, p < 0.01). Alcohol abuse was also significantly associated with GRC/S sub-dimension *Success, power, competition* (AOR 1.56, 95% CI: 1.12–2.16, p < 0.01), but not any of the other sub-dimensions. In the combined model (model 4), only the GRC/S composite remained significantly associated with alcohol abuse (AOR: 1.49, 95% CI: 1.11–1.98, p = 0.007).

Discussion

We examined the association between inequitable gender norms and GRC/S and three HIV risk behaviors among men in Mpumalanga, South Africa. Consistent with the

literature, all three risk behaviors were prevalent among men in our sample [54–59], suggesting an environment conducive to HIV transmission. Levels of concurrency were particularly high, at 38%, as were levels of IPV perpetration among younger men in the sample (16.4% among ages 18–24) and alcohol abuse among older men (28.4% among ages 25–35). As hypothesized, more inequitable gender norms (as measured by the GEM scale) was significantly associated with an increased odds of sexual partner concurrency, IPV perpetration, and alcohol abuse. This finding supports the theorized centrality of social constructions of masculinity to men's HIV-related risk behaviors [5, 6, 60], and is consistent with other research documenting such associations in South African communities [11, 12, 34, 61, 62]. However, this effect only held when gender norms (GEMS) was considered alone; the effect became non-significant in the combined model (model 4) that included both gender norms and the GRC/S-composite. The reason for this attenuation effect is unclear, and may vary by behavioral outcome. The attenuation

effect could suggest collinearity, although as noted GEMS and the GRC/S scale were only moderately correlated ($r = 0.48$) and typical tests such as the variance inflation factor, or assessing model fit for a factor including all GEMS and GRC/S scale items together [53], did not suggest collinearity. Findings about attenuation could also suggest mediation, in which inequitable gender norms lead to GRC/S, which in turn leads to behavior. Longitudinal and intervention research is needed to examine the interplay between these two constructs and their relationship to risk behaviors.

We found that GRC/S (the composite variable) was significantly associated with an increased odds of each risk behavior when examined alone, and, with the exception of concurrency, this association held when the gender norms variable was included in the models (model 4). Therefore, in addition to a cognitive process through which men learn about and adhere to gender norms, to more fully understand men's behavior our results suggest the need to also consider the psychological conflict and stress they experience from trying to meet, and failing to meet, expectations of themselves as men. Additional quantitative analyses using the four GRC/S scale sub-dimensions provided more nuanced insight into associations between GRC/S and the different behavioral outcomes, as other studies have found [24, 35]. *Subordination to women* appears key to sexual partner concurrency, which may suggest that men use sex as a way of asserting power over women. That *Restrictive emotionality* is key for IPV perpetration has also been found in other studies [24]. Unidentified and unexpressed emotions may be expressed as anger, hostility, and violence against women and may serve as an impediment to engaging in conflict resolution in relationships. Finally, experiencing strain around *Success, power, competition*, likely due to chronic unemployment or underemployment, may induce maladaptive coping through alcohol abuse as a way of tempering gendered self-expectations [21, 63].

Our findings have implications for HIV and violence prevention programming. In South Africa and other countries worldwide, governments and international organizations are promoting a gender equality agenda to engage men as partners in HIV and violence prevention efforts [64, 65]. The World Health Organization has championed a "gender transformative" approach that directly questions gendered beliefs and behaviors, particularly among men, which has been used in over 60 programs worldwide [66–68]. South Africa, for instance, has been host to large-scale and ongoing gender transformative programs such as Stepping Stones, Men as Partners, and the One Man Can campaign [69–71]. Although more rigorous evaluation of such programs is needed, there are promising results in changing gender attitudes, violence and sexual behaviors, and even biological outcomes related to HIV/sexually

transmitted infections (STIs) [66, 68, 72, 73]. Our findings support the importance of gender transformative programming in the HIV prevention landscape [74]. In particular, given the high prevalence of concurrency we found in this study site, efforts are urgently needed to challenge the pervasive belief that men need or are entitled to have multiple sexual partners and the social respect accorded to this behavior [57].

Even if gender norms change, without addressing the drivers of gender role conflict/stress in men's lives, circumstances may persist that prevent men from enacting more gender-equitable practices, undermining HIV and violence prevention efforts [60, 67]. This suggests that gender transformative programming should be coupled with strategies to reduce GRC/S to improve impact on men's risk behaviors. Few if any evidence-based approaches to prevent or reduce men's gender role conflict or stress currently exist, in the U.S. or internationally. However, theory, in particular the Gender Role Strain Paradigm and O'Neil's recent work to conceptualize and pilot prevention approaches, provide a framework to help understand how to prevent or reduce GRC/S which can be used to design and evaluate targeted intervention strategies to integrate into gender transformative programming [19, 21]. For example, theory suggests the importance of increasing opportunities for men to play positive roles in their families and communities (for example promoting engaged fatherhood and youth mentorship), preventing traumatic gender socialization experiences, especially early in life, and promoting skills and resources for more adaptive coping with stress.

Our results also suggest specific ways to address men's GRC/S in the South African setting. Reducing men's worries about women's dominance in the workplace, economic earning power, or decision making (*Subordination to women*) could reduce concurrency behavior, for example by challenging the zero-sum game mentality in which women gaining means men losing. Helping men move away from *Restricting emotions* could reduce IPV perpetration, for example, through men's support groups. Finally, reducing strain around *Success, power, competition* could reduce alcohol abuse, for example, through income generation and training opportunities. More broadly, addressing the conflict and stress men experience around perceived gendered expectations, particularly for stressors like unemployment that are difficult to change through programming, implies redefining gendered expectations to include alternative positive masculine roles. For example the male provider role, which is traditionally defined around work and income generation, can be reframed as placing more emphasis on active parenting. Additionally, helping men cope with stress in more productive and adaptive ways could assist men with venting

their feelings; seeking and receiving social support may be particularly helpful, as well as addressing guilt from past harmful behavior [63]. Program experience in the African setting, for example, shows that men's groups can be beneficial in providing a safe space for men to express worries, share personal stories, and seek advice [68, 72].

Our findings should be interpreted with several limitations in mind. First, our data come from a cross-sectional survey, which limits our ability to determine temporal and causal order of relationships between variables. It is possible that changes in behavior could produce changes in gender norms or GRC/S, rather than (or in addition to) the other way around. Second, as mentioned, the attenuation of effects present in the combined models (model 4) necessitates further research to understand the relationship between these variables. Third, data are based on self-report, which could introduce social desirability response bias [75]. Finally, although limiting the sample to men only was necessary to reduce the complexity of the study, we acknowledge that gender is constructed relationally and solutions require involving both men and women [67]. In addition, limiting the sample to non-migrating men, as permanent residence was an eligibility criterion, may limit generalizability of our findings to men migrating from these communities to find work.

Conclusion

We found that both gender norms and gender role conflict/stress are associated with men's HIV risk behavior in this setting. This suggests that to better understand men's sexual, partner violence and alcohol abuse behaviors in the African setting and perhaps beyond, theory and research should consider not only what men perceive to be gender role expectations (i.e., their cognitive appraisal of norms), but also the psychological strain they experience around living up to perceived expectations of themselves as men. These findings have implications for prevention programs moving forward. Programs seeking to transform gender norms and promote more flexible masculinities at the individual and community levels are crucial and should be coupled with strategies to recognize and reduce men's GRC/S. Research is needed to identify such strategies and detailed longitudinal evaluation of efforts will help increase impact on HIV vulnerability over time.

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